

**LAT 39.09187 LON -120.73177**

**United States  
St.**

**Forest**

**Lassen**

**55 So Sacramento**

Department of  
Susanville, CA 96130

Service

National

Agriculture

Forest

916-257-2151 VOICE

916-257-6244 TTY

File Code: 3400  
10, 1997

Date: September

Subject: Black stain root disease and western gall rust at the  
Foresthill Seed Orchard (NE97-11)

To: District Ranger, Foresthill Ranger District

On August 7, Larry Binder and I examined diseased Douglas fir and ponderosa pine at the Foresthill Seed Orchard. We also examined some dead foliage on young white.

Black stain root disease

Four trees in a Douglas fir shelter belt are dead or dieing from black stain root disease. The Doug fir are 30 to 40 feet in height. The two dead trees are separated by apparently healthy Doug fir, indicating that these trees are the result of separate infections. The two infected trees are near

## **LAT 39.09187 LON -120.73177**

one of the dead trees, indicating possible local spreading via root contact. Black stain root disease is caused by the fungus Leptographium wageneri. A discussion of this disease is provide on pages 144-146 in "Diseases of Pacific Coast Conifers" (a copy is enclosed for the Seed Orchard's Library). The biology of this disease is appended to this memo.

The Douglas fir shelter belt will be removed in the future to provide room for planting other conifer species. Since Doug fir black stain disease only infects Doug fir, it may not be critical to treat this infection. However, since Douglas fir grows in the surrounding forest, and since black stain disease is uncommon in the area, it may be wise to remove the infected trees (and buffer trees, one to two trees deep, around this infection center) to reduce the inoculum for infecting the natural Doug fir in the surrounding forests. Since the disease is thought to be spread by root feeding beetles, it is recommended to remove the trees in the fall and winter when insects are not active.

### Western gall rust

Larry showed me a ponderosa pine that had a gall growing on a branch about 20 feet above the ground. The gall is cause by the fungus Peridermium harknessii. A discussion of this disease is provided on pages 92-93 in "Diseases of Pacific Coast Conifers. The disease is not serious until the majority of the tree is infected. However, the gall produces rust spores in the spring which can spread the disease to other branches or trees. In the forest, this disease is not treated, except by selecting heavily infected trees during periodic silvicultural removals. Due to the high value of the pine in this seed orchard, it is wise to prune the galls from the trees when they are discovered.

### White fir shoot dieback

**LAT 39.09187 LON -120.73177**

There are a number of small grafted white fir trees in the orchard with random dead shoots on the young root stock portions of the trees. Sheri Smith, entomologist, examined some samples from these trees and ruled out insects as the causal agent. I cultured some of the needles in hopes of identifying a pathogen in the material, but the results were negative. Two other pathologists viewed photos of affected trees and were unable to identify the condition. Sheri and I believe the dieback may be the result of something in the soil or some foliar spray, but we aren't sure. I recommend monitoring this condition to see if the condition becomes more prevalent and to see if it persists into the next growing season.

I will visit the seed orchard occasionally to monitor the white fir over the next year. At the same time I will monitor the black stain root disease in the Douglas fir. If you have any questions, please DG me at B.Woodruff:R05F06A.

BILL WOODRUFF  
Plant Pathologist

NE California FPM Service Center

Enclosures

**LAT 39.09187 LON -120.73177**

**PEST BIOLOGIES**

BLACK STAIN ROOT DISEASE is caused by the fungus Ceratocystis wagneri (asexual state Verticicladiella wagneri). In California, the fungus has three host-specific strains that infect either ponderosa and Jeffrey pine, singleleaf pinyon pine, or Douglas-fir. In most situations, the fungus does not cross-over between species, even in mixed species stands.

Initiation of disease centers probably occurs when spore-carrying, cambiumfeeding beetles invade tree roots and transmit the spores of the fungus to the tree. The fungus then grows in the wood of the root toward the root collar.

Once the fungus becomes established in a tree, it spreads locally between trees through rootlet contact or fungus growth through the soil for short distances and direct infection of small feeder roots. The rate of underground spread in a ponderosa pine stand is highly variable and dependent on species composition, stand density, and site; on the Georgetown Divide, El Dorado County, the average annual radial spread was 4 feet (range 0 to 20 feet). The rate is not substantiated for Douglas-fir, although it appears to be faster than in pine.

The disease can be identified in a tree by the dark brown to black stain of the wood. This stain occurs as arcs that follow the annual rings. The amount of stain around the bole varies among trees. It may involve only a small part of the tree's circumference or it may encircle the tree. The stain may be one to many annual rings deep.

Infected trees undergo gradual to rapid crown decline prior to mortality. Symptoms of crown decline include reduced terminal growth, needle yellowing and shortening, and premature loss of foliage. Trees pole-size and larger may also bear a heavy cone crop. Bark and engraver beetles can successfully attack and kill infected trees. Douglas-firs may have grayish-blue resin streaming

**LAT 39.09187 LON -120.73177**

from the bark above the stained area.

Little information is available on stand and site characteristics associated with the disease. On the Georgetown Divide, pure or predominantly ponderosa pine stands with moderate to high stand densities had a higher probability of being infected. The disease appeared to be limited to an elevational band of 4000 to 5000 feet. A characteristic of the disease in Douglas-fir is its higher incidence along roads and in young plantations or dense natural regeneration.

-----

WESTERN GALL RUST (Peridermium harknessii). Western gall rust causes branch galls and trunk cankers on nearly all species of hard pines. The rust fungus produces yellow to orange-colored spores (aeciospores) on the surface of the galls during cool, moist, spring weather. The spores are wind disseminated and can infect other pines directly. Invasion of the pine bark by the rust fungus results in the formation of woody galls. Galls on branches are typically subglobose or spindle-shaped. The galls continue to enlarge and produce new spores each spring until they have girdled and killed the branch or stem. Girdling of branches results in a reduction of tree growth. Trunk cankers deform and reduce the strength of the bole.